



March 1, 2022



2022

Everglade snail kite foraging at Lakeside Ranch STA (photo by SFWMD).

# SOUTH FLORIDA ENVIRONMENTAL REPORT

## Highlights

Water Year 2021 (May 1, 2020–April 30, 2021)

Fiscal Year 2021 (Oct. 1, 2020–Sept. 30, 2021)

The **2022 South Florida Environmental Report (SFER)** documents an important year of restoration, scientific and engineering accomplishments in the Kissimmee Basin, Lake Okeechobee, Everglades and South Florida coastal areas. The report also provides extensive peer reviewed research summaries, data analyses, financial updates and a searchable database of environmental projects. The report covers environmental information for Water Year 2021 (WY2021; May 1, 2020–April 30, 2021) and project budgetary and construction information for the South Florida Water Management District (SFWMD or District) for Fiscal Year 2021 (FY 2021; Oct. 1, 2020 –Sept. 30, 2021). The full 2,918-page report is available at [SFWMD.gov/sfer](http://SFWMD.gov/sfer).

# PROGRESS RELATED TO EXECUTIVE ORDER 19-12

## Achieving More Now For Florida's Environment

**Governor Ron DeSantis signed Executive Order 19-12: Achieving More Now For Florida's Environment** to implement major reforms and ensure the protection of Florida's environment and water quality. The order urged immediate action and investment in water quality and Everglades restoration. The SFWMD and Florida Department of Environmental Protection (FDEP) made astounding progress on critical Everglades restoration projects including building water storage north, south, east and west of Lake Okeechobee. Forty-four significant milestones have been achieved over the past three years to improve water management for the benefit of more than 9 million South Floridians and the communities in which we serve. Since Executive Order 19-12 was signed, the Florida Legislature appropriated more than \$2 billion for Everglades Restoration and water quality efforts.

### MOMENTUM CONTINUES FOR SENDING MORE WATER SOUTH AND REDUCING HARMFUL DISCHARGES

Under the leadership of Governor DeSantis, FDEP Secretary Shawn Hamilton and the SFWMD Governing Board made significant progress on the Everglades Agricultural Area (EAA) Reservoir Project. SFWMD began working on the project site in April 2020 for the 6,500-acre treatment wetland component, known as a stormwater treatment area (STA) of the EAA Reservoir Project. The EAA Reservoir Project is one of the most important Everglades restoration projects of the Comprehensive Everglades Restoration Plan (CERP). The project will provide ecological benefits, reduce harmful discharges to the St. Lucie and Caloosahatchee estuaries, and send more clean water south to the Everglades. In April 2021, a Project Partnership Agreement was signed with the U.S. Army Corps of Engineers (USACE) to allow the USACE to begin federal construction on the reservoir component of the EAA Reservoir Project.

*"When I took office, I made expediting the EAA Reservoir Project a top priority. Signing this agreement means we are another step closer to moving more clean water south through the Everglades and reducing harmful discharges from Lake Okeechobee into the Caloosahatchee and St. Lucie estuaries."*

— Governor Ron DeSantis



EAA Project Partnership Agreement Signing with Governor Ron DeSantis (photo by SFWMD).

Top Row: SFWMD Governing Board Member Jay Steinle, Superintendent of Everglades and Dry Tortugas National Parks Pedro Ramos, SFWMD Governing Board Vice-Chair Scott Wagner, USACE Jacksonville District Lt. Col. Todd Polk, SFWMD Governing Board Member Jacqui Thurlow-Lippisch, FDEP Secretary Noah Valenstein, Former Senator Joe Negron. Bottom Row: Governor Ron DeSantis and SFWMD Governing Board Chairman Chauncey Goss.



Blasting for the EAA Reservoir Project (photo by SFWMD).

## COMPLETED C-44 RESERVOIR AND STA TO CURB HARMFUL DISCHARGES TO THE ST. LUCIE ESTUARY

On Nov. 19, 2021, the SFWMD and the USACE hosted a ribbon cutting to celebrate completion of the Indian River Lagoon-South C-44 Reservoir and STA. The C-44 component of the Indian River Lagoon-South project will capture, store, and treat nutrient-rich water, revitalize habitat, help restore the balance of fresh and salt water in the Indian River Lagoon and the St. Lucie Estuary, and provide significant water quality improvements. This is the largest CERP project ever completed. The completion of the C-44 Reservoir and STA is another inspiring example of Everglades Restoration partnerships, success and progress.

*"The bold vision and leadership of Governor DeSantis and critical partnerships, like with the water management district and the Army Corps, will allow us to continue to expedite Everglades restoration and reach milestones like the ribbon cutting we are here to celebrate today. This critical project will revitalize habitat in the Indian River Lagoon, help restore the balance of fresh and salt water in the Indian River Lagoon and the St. Lucie Estuary, and provide significant water quality improvements." — FDEP Secretary Shawn Hamilton*

The reservoir provides 50,000 ac-ft of new water storage and 6,300 acres of new wetlands. The Indian River Lagoon watershed is home to more than 4,300 species of plants and animals and supports an annual economic contribution of more than \$730 million. In addition, the Indian River Lagoon is known as the most bio-diverse habitat in North America and is designated an Estuary of National Significance by the U.S. Environmental Protection Agency.



C-44 Ribbon Cutting Celebration (photo by SFWMD). L-R: SFWMD Governing Board Member Ben Butler, SFWMD Governing Board Member Jay Steinle, SFWMD Executive Director Drew Bartlett, SFWMD Governing Board Chairman Chauncey Goss, SFWMD Governing Board Member Jacqui Thurlow-Lippisch, SFWMD Governing Board Member Charlette Roman, USACE Jacksonville District Col. James Booth, Lt. Gov. Jeanette Nuñez, Rep. Toby Overdorf, FDEP Secretary Shawn Hamilton, Sen. Gayle Harrell, Regional Director for U.S. Sen. Marco Rubio - Greg Langowski, Martin County Chairman Doug Smith, U.S. Department of the Interior Assistant Secretary for Fish and Wildlife and Parks Shannon Estenoz, and Martin County Commissioner Stacey Hetherington.

## CONSTRUCTION COMPLETE ON THE KISSIMMEE RIVER RESTORATION PROJECT

On July 19, 2021, the SFWMD and USACE hosted a ribbon cutting to celebrate construction completion for the Kissimmee River Restoration Project. The Kissimmee River Restoration Project restores more than 40 square miles of the river floodplain ecosystem, 20,000 acres of wetlands and 44 miles of the historic river. Over the past 22 years, the USACE and SFWMD worked together to complete backfilling of 22-miles of the C-38 Canal between Lake Kissimmee and Lake Okeechobee; reconstruct remnant river channels across the backfilled canal to reconnect and restore flow in remnant river channels; remove two water control structures; add two gates to the S-65 water control structure; and acquire more than 100,000 acres of land to restore the river and floodplain.



Ribbon cutting ceremony for the newly completed Kissimmee River Restoration Project (photo by SFWMD). L-R: USACE Jacksonville District Col. Andrew Kelly, SFWMD Executive Director Drew Bartlett, SFWMD Governing Board Member Charlette Roman, Acting Assistant Secretary of the Army for Civil Works Jaime Pinkham, U.S. Department of Interior Assistant Secretary for Fish and Wildlife and Parks Shannon Estenoz, SFWMD Water Resources Director Lawrence Glenn, SFWMD Governing Board Chairman Chauncey Goss, FDEP Secretary Shawn Hamilton, County Coalition Chairperson Karson Turner, SFWMD Governing Board Member Jacqui Thurlow-Lippisch, USACE Major General William (Butch) H. Graham, SFWMD Governing Board Member Ben Butler and Rep. Toby Overdorf.

The Kissimmee River is a significant part of America's Everglades and this project is vital to restoring the Greater Everglades Ecosystem. The historic Kissimmee River once meandered for 103 miles through Central Florida. Its floodplain, reaching up to two miles wide, was inundated for long periods by heavy seasonal rains. Recurring and prolonged flooding impacted local residents and resulted in Congressional authorization of the Central and Southern Florida Project, which included channelizing the Kissimmee River and floodplain. Construction of the C-38 Canal achieved flood reduction benefits, but it also harmed the river-floodplain ecosystem. The decline of the ecosystem spurred federal, state and local partnerships to embark on one of the world's largest riverine restoration efforts: the Kissimmee River Restoration Project. The project's efforts resulted in the recovery of the invertebrate community, a crucial food resource for fish and birds. Additional monitoring will be conducted to measure the project's success, and additional projects and restoration efforts in the region will support continued restoration of Florida's iconic Kissimmee River.

## OLD TAMiami TRAIL ROADBED REMOVAL PROJECT COMPLETED SIX MONTHS AHEAD OF SCHEDULE

On Aug. 3, 2021, Governor Ron DeSantis joined the FDEP, SFWMD, USACE, and other state and federal officials to celebrate the completion of the Old Tamiami Trail Roadbed Removal Project, which was completed six months ahead of schedule. This project is a critical Everglades restoration project to remove nearly six miles of roadbed from the Old Tamiami Trail to allow more water to naturally flow south into Everglades National Park. This crucial project is a component of the larger Central Everglades Planning Project (CEPP), which also includes the EAA Reservoir Project. CEPP will help deliver additional clean water from Lake Okeechobee south to Water Conservation Area (WCA) 3, Everglades National Park and Florida Bay.

Old Tamiami Trail is a historic highway that was built across the Everglades to connect Tampa and Miami in the early 1900s. By removing the roadbed, the project helps restore the ecologically important sheet flow of water south through the Everglades. The roadbed removal increases the flow of clean freshwater into the Northeast Shark River Slough area of the park by more than 220 billion gallons per year.



*Completion of the Old Tamiami Trail Roadbed Removal Project (photo by SFWMD).*

L-R: SFWMD Governing Board Members Carlos "Charlie" Martinez, Ron Bergeron Sr., Vice-Chairman Scott Wagner, Member Charlette Roman, Governor Ron DeSantis, SFWMD Governing Board Chairman Chauncey Goss, SFWMD Governing Board Members Cheryl Meads, Jacqui Thurlow-Lippisch, Jay Steinle, and Executive Director Drew Bartlett.

## SFWMD BREAKS GROUND ON UNDERGROUND WALL TO SUPPORT EVERGLADES RESTORATION

On Aug. 20, 2021, the SFWMD held a groundbreaking ceremony for the construction of an underground seepage wall in the 8.5 Square Mile Area (Las Palmas Community). The underground concrete wall helps mitigate flooding in the 8.5 Square Mile Area, keeps water in Everglades National Park, and supports increased flows of water south which are necessary for Everglades restoration. Seepage walls are well-established engineering features that help limit the flow of water underground that can lead to above-ground flooding. This seepage wall is over two miles long, 63 feet deep, and 26 inches wide. When completed, the seepage wall will work in conjunction with other Everglades restoration projects to send more water south. As we build more infrastructure to move, store, and clean water so it can move into the Everglades, this new construction mitigates flooding in the 8.5 Square Mile Area.



*Breaking Ground on Underground Wall to Support Everglades Restoration (photo by SFWMD). L-R: USACE Jacksonville District Lt. Col. Todd Polk, SFWMD Executive Director Drew Bartlett, Congressman Carlos Gimenez, Lt. Gov. Jeanette Nuñez, SFWMD Governing Board Member Ron Bergeron Sr., Miami-Dade County Board of County Commissioners Chairman Jose "Pepe" Diaz, Superintendent of Everglades and Dry Tortugas National Parks Pedro Ramos, CEO of the Everglades Foundation Eric Eikenberg, and FDEP Southeast District Director Jason Andreotta.*

## MAJOR COMPONENTS OF THE CALOOSAHATCHEE (C-43) RESERVOIR ARE ADVANCING

The Caloosahatchee Reservoir aims to reduce harmful discharges to the Caloosahatchee Estuary and provide beneficial freshwater flows to the Caloosahatchee Estuary in the dry season. This project is a major part of CERP and designed to store approximately 170,000 ac-ft of water. After the signing of Executive Order 19-12, the SFWMD worked with the FDEP, Lee County, Hendry County, Lehigh Acres Municipal Services Improvement District, the City of Cape Coral, the City of Sanibel, stakeholders and the public to complete a Caloosahatchee Reservoir Water Quality Feasibility Study to improve the quality of water leaving the reservoir. The Caloosahatchee Reservoir Project is expected to be completed and fully operational within the next couple of years.



Governor Ron DeSantis, along with state and local officials, breaks ground on embankments and canals to advance the Caloosahatchee (C-43) Reservoir (photo by SFWMD).



Installation of a New Pump at a Caloosahatchee (C-43) Reservoir Pump Station (photo by SFWMD).

## What is a FEB?

Flow equalization basins (FEBs) are constructed impoundments designed to capture water. They can provide a steadier flow of water to STAs, helping to maintain desired water levels needed to achieve optimal water quality, improve performance and prevent dry out, which can be extremely damaging to STA vegetation.

## MAJOR MILESTONE FOR PICAYUNE STRAND RESTORATION PROJECT

On July 9, 2021, the SFWMD reached a major milestone for the Picayune Strand Restoration Project in Collier County as the Faka Union Pump Station turned on for the first time. The pump station, coupled with other restoration activities, works to rehydrate drained wetlands in the Picayune Strand State Forest and restore the area's natural sheet flow and health of downstream estuaries and habitats. The Faka Union Pump Station is now operational and restoration flows are now hydrating previously drained wetlands.



Activation of the Faka Union Pump Station at the Picayune Strand Restoration Project (photo by SFWMD).

## PROGRESS CONTINUES ON INCREASING WATER STORAGE NORTH OF LAKE OKEECHOBEE

Progress continues to increase water storage and restore wetlands north of Lake Okeechobee. The SFWMD is building underground storage wells known as aquifer storage and recovery (ASR) wells as part of the Lake Okeechobee Watershed Restoration Project in accordance with a science plan. The SFWMD continues to follow the science on this project and research water treatment technologies necessary to clean the water. Additionally, the SFWMD is making plans to restore thousands of acres of wetlands along the Kissimmee River to support water quality improvements and benefits for wildlife.



Existing Kissimmee River ASR well site (photo by SFWMD).

## DISPERSED WATER MANAGEMENT (DWM) PROJECTS

Brighton Valley DWM, Bluefield Grove Water Farm and Scott Water Farm provide water storage on private property by holding stormwater or even pulling excess water from a regional canal system. These projects help improve water quality and enhance plant and wildlife habitat. All three projects are complete and operational.

### Brighton Valley DWM Project

This 8,000-acre project pumps excess water from the C-41A Canal and is estimated to treat up to 40,000 ac-ft of water per year and remove approximately 3 metric tons of phosphorus and 27 metric tons of nitrogen annually before it enters Lake Okeechobee.



Brighton Valley DWM Project (photo by SFWMD).

### Bluefield Grove Water Farm

The Bluefield Grove Water Farm can capture over 9 billion gallons of regional stormwater before it enters the St. Lucie Estuary and makes a difference in water quality. This 6,100-acre project removes approximately 3 metric tons of phosphorus and 12 metric tons of nitrogen annually from the C-23 Basin.



Bluefield Grove Water Farm ribbon cutting (photo by SFWMD). L-R: SFWMD Governing Board Member Jacqui Thurlow-Lippisch, Evans Properties Project Manager HM Ridgely, SFWMD Executive Director Drew Bartlett, Evans Properties CEO & President Ron Edwards, Rep. Toby Overdorf, St. Lucie County Vice-Chair Frannie Hutchinson, and SFWMD Governing Board Member Ben Butler.

### Scott Water Farm

The Scott Water Farm can store more than 9 billion gallons of local storm water runoff and was designed to reduce harmful estuary discharges. The project will retain onsite rainfall and pump water from the C-25 Canal and store it on approximately 7,500 acres of privately-owned land. The project has the capability to reduce more than 3 metric tons of phosphorus per year, and over 13 metric tons of nitrogen per year.



Scott Water Farm ribbon cutting (photo by SFWMD). L-R: St. Lucie County Chair Sean Mitchell, Indian River County Commissioner Laura Moss, SJRWMD Governing Board Member Doug Bournique, Indian River County Vice-Chair Joe Earman, Evans Properties CEO & President Ron Edwards, Okeechobee County Vice-Chair David Hazellief, SFWMD Executive Director Drew Bartlett, SFWMD Governing Board Member Jacqui Thurlow-Lippisch, Rep. Toby Overdorf, SFWMD Governing Board Member Charlette Roman, FDEP Deputy Secretary Adam Blalock, County Coalition Chairperson Karson Turner, SFWMD Governing Board Member Cheryl Meads and SFWMD Governing Board Member Ben Butler.

## NUBBIN SLOUGH STA

This 773-acre, two-celled STA diverts and treats runoff from Nubbin Slough before it enters Lake Okeechobee. Substantial enhancements to the Nubbin Slough STA levee and seepage ditch were completed in Aug. 2021, restoring storage and treatment capacity within the project.



Nubbin Slough STA (photo by SFWMD).

## LAKESIDE RANCH STA

The Lakeside Ranch STA Project removes approximately 16 metric tons of phosphorus each year that would otherwise end up in Lake Okeechobee. Construction on the S-191A Pump Station at Lakeside Ranch was completed in Sept. 2021 and marked the final component of this major STA project. The project is a key component of the Northern Everglades and Estuaries Protection Program (NEEPP) and is identified in the Lake Okeechobee Basin Management Action Plan to improve water quality for Lake Okeechobee.



Lakeside Ranch STA (photo by SFWMD).

## What are STAs?

Stormwater treatment areas (STAs) are large, constructed wetlands with inflow and outflow structures for controlling water movement. Aquatic plants in the STAs remove and store excess nutrients (phosphorus) found in the stormwater runoff through growth and accumulation of dead plant material in the layers of sediment. This natural process cleanses the water before it is moved out of the STA and into the Everglades or other water bodies.

## 6,700 ACRES OF WETLANDS RESTORED AT ALLAPATTAH FLATS

The Allapattah Flats Wetland Reserve Project restored 6,700 acres of wetlands in Martin County. A Natural Lands component of the Indian River Lagoon-South CERP Project, property for Allapattah Flats Wetland Reserve Project was jointly purchased by SFWMD and Martin County and restored in cooperation with the USDA Natural Resources Conservation Service. The project improves water quality, decreases runoff and curtails harmful discharges to the St. Lucie Estuary. Restoring this vast area of wetlands also returns valued habitat to threatened and endangered species.



Allapattah Flats Wetland Reserve Project (photo by SFWMD).

## SFWMD COMPLETES S-333 NORTH (S-333N), DOUBLES AMOUNT OF WATER THAT CAN BE SENT SOUTH

On Oct. 21, 2020, Governor Ron DeSantis joined the leaders of FDEP, SFWMD, USACE, and other state and federal officials to celebrate the completion of the S-333N structure. Projects like the S-333N and all of the CEPP South suite of projects will help restore the historic flow of water to the south to rehydrate Everglades National Park, deliver more fresh water to Florida Bay, and reduce high water conditions in the Everglades WCAs that hurt wildlife and plant communities. The S-333N structure, adjacent to the existing S-333 water control structure about 35 miles west of Miami, doubles the amount of water that can be moved south through that area out of the WCAs and into Everglades National Park. The S-333N structure will work together with other critical Everglades restoration projects including the EAA Reservoir Project to decrease harmful estuary discharges and deliver more flows of water south. The structure can also be used during high water emergency situations to prevent high water conditions in the WCAs.



S-333N Completion Event (photo by SFWMD). L-R: SFWMD Governing Board Member Jay Steinle, USACE Jacksonville District Col. Andrew Kelly, SFWMD Governing Board Chairman Chauncey Goss, SFWMD Governing Board Vice-Chair Scott Wagner, SFWMD Governing Board Member Ron Bergeron Sr., SFWMD Executive Director Drew Bartlett, SFWMD Governing Board Member Charlette Roman, and SFWMD Governing Board Member Jacqui Thurlow-Lippisch.

## C-139 FLOW EQUALIZATION BASIN (FEB) BREAKS GROUND

On March 18, 2021, the SFWMD broke ground on the C-139 FEB, an 11,000-acre shallow storage feature. It will store local basin runoff from the C-139 Basin and control the flow of water to the adjacent STA5/6. This will help improve the performance of STA5/6, removing nutrients from stormwater and improving the region's water quality.



Groundbreaking of the C-139 FEB (photo by SFWMD). L-R: FDEP Southeast District Director Jason Andreotta, Mayor of Clewiston Kristine Petersen, SFWMD Executive Director Drew Bartlett, SFWMD Governing Board Chairman Chauncey Goss, County Coalition Chairperson Karson Turner and Andres Mendoza, President of Condotte America.

## C-139 ANNEX RESTORATION - SAM JONES/ABIAKI PRAIRIE RESTORATION PROJECT

The Sam Jones/Abiaki Prairie Restoration Project restores wetlands and provides important benefits to groundwater, surface water and water supply in the region. The project also improves native plant and wildlife habitat for a variety of species, including wading birds, hawks, eagles, panthers, black bears, and bobcats. The SFWMD coordinates with the Seminole Tribe of Florida to restore this environmentally sensitive land. To date, more than 2,000 acres have been planted with 100 different species of native vegetation – and the progress continues. The project's second phase began in 2021 and includes all of the remaining construction and restoration activities.



C-139 Annex Restoration – Sam Jones/Abiaki Prairie Restoration Project (photo by SFWMD).

### How much is an acre-foot?

An acre-foot (ac-ft) is the volume needed to cover 1 acre of land with 1 foot, or 325,851 gallons, of water.

## RESTORATION STRATEGIES

The SFWMD developed the Restoration Strategies Regional Water Quality Plan to address water quality concerns associated with existing flows to the Everglades Protection Area. It contains a suite of additional water quality improvement projects to work in conjunction with the existing Everglades STAs to meet the water quality based effluent limit (WQBEL) to achieve compliance with the State of Florida's numeric Total Phosphorus criterion in the Everglades Protection Area.

### A-1 FEB

A 15,000-acre aboveground impoundment capable of storing approximately 60,000 ac-ft of water. It attenuates peak stormwater runoff flows, temporarily stores stormwater runoff, and improves delivery rates of water to STA2 and STA3/4. This enhances the operation and phosphorus treatment performance of the STAs. In WY2021, over 270,000 ac-ft of water was conveyed into the FEB and over 207,000 ac-ft of water was conveyed out. Also, in WY2021, it reduced the annual Total Phosphorus load from 26.5 to 4.3 metric tons, resulting in an annual Total Phosphorus load reduction of 84% (equivalent to 22.2 metric tons).

### STA1 West Expansion #1

An approximately 15,000-acre former citrus grove will be restored to its historic condition as a wet prairie system with depression marshes, cypress domes, and hardwood hammocks. The project provides benefits to groundwater, surface water and water supply in the region.

### STA1 West Expansion #2

This project provides an additional 6,500 acres of water quality treatment capacity to improve Everglades water quality.

### STA3/4

STA3/4 is the best performing STA in the EAA and provides an additional 16,300 acres of water quality treatment capacity to improve Everglades water quality.

### STA5/6 Internal Improvements

This project provides an additional 4,300 acres of water quality treatment capacity to improve Everglades water quality.



STA5/6 (photo by SFWMD).

### Everglades STAs Combined

Large freshwater treatment wetlands are an integral part of efforts to preserve the remaining Everglades ecosystem. These wetlands south of Lake Okeechobee are designed to reduce Total Phosphorus concentration in surface water runoff prior to discharging this water into the Everglades Protection Area. The STAs currently encompass 62,000 acres of treatment area permitted to operate, which includes the expanded treatment areas of STA1 West, STA2, and STA5/6, as well as STA 1E and STA3/4. In WY2021, the combined Everglades STAs treated approximately 1.6 million ac-ft of water and retained 207 metric tons of phosphorus, which equated to a 78% load reduction. Approximately 162,000 ac-ft of inflow volume in this water year came from Lake Okeechobee, of which 147,000 ac-ft were regulatory releases, while 15,000 ac-ft were delivered as supplemental water to maintain Everglades STA cell water levels at target stage.

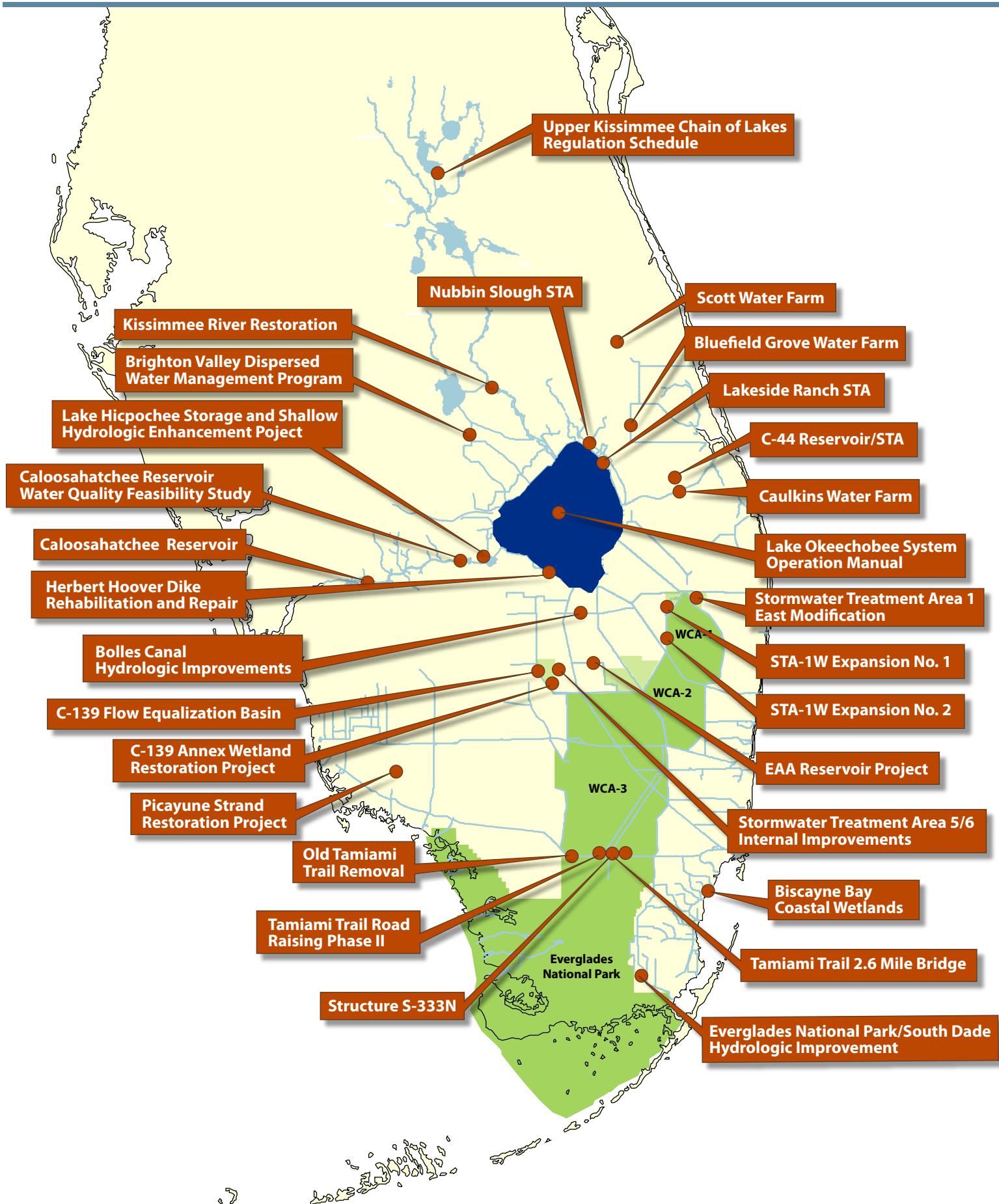


STA1 West (photo by SFWMD).

## What are Nutrients?

In aquatic environments, nitrogen and phosphorus are key nutrients that affect the growth rate of plants. Although the nutrients phosphorus and nitrogen are vital in all natural systems, too much nutrients in an ecosystem can have harmful ecological consequences. Nutrients can flow across the landscape in stormwater runoff as pollution (urban and agricultural). This can harm natural areas by promoting algae growth, creating an overabundance of non-native plants, crowding out natural vegetation and disrupting food sources and habitats.

The Everglades is naturally an extremely low-nutrient system. Even small amounts of additional nutrients can upset the delicate ecological balance needed by the native plants and animals in the historic “River of Grass.” Phosphorus is normally recorded in micrograms per liter ( $\mu\text{g/L}$ ) or parts per billion (ppb) and nitrogen is normally recorded in milligrams per liter ( $\text{mg/L}$ ) or parts per million (ppm). In this document, Total Phosphorus (TP) and Total Nitrogen (TN) are used to denote measurement when monitoring the nutrients found in water bodies or as they relate to inflows and outflows of water.



## ENSURING THE REGION'S WATER RESOURCES AND ECOSYSTEMS RESILIENCY NOW AND IN THE FUTURE

The SFWMD is strongly committed to addressing the impacts of climate change, including rising sea levels, changing rainfall and flood patterns. The SFWMD named its first District Resiliency Officer, Carolina Maran, Ph.D., P.E. to support the agencies increased resiliency efforts. Current efforts focus on assessing how sea level rise and extreme events, including flood and drought events, happen under current and future climate conditions, and how they affect water resources management. The SFWMD is also making significant infrastructure adaptation investments that are needed to successfully implement its mission of safeguarding and restoring South Florida's water resources and ecosystems, protecting communities from flooding, and ensuring an adequate water supply for all of South Florida's needs. Working to ensure the region's water resources and ecosystems resiliency, now and in the future, is part of everything the SFWMD does.

### Water and Climate Resilience Metrics

As part of our ongoing resilience initiatives, the SFWMD developed a set of Water and Climate Resilience Metrics to track and document shifts and trends in SFWMD-managed water and climate observed data. These efforts support the assessment of current and future climate condition scenarios, operational decisions, and SFWMD resiliency priorities. The SFWMD published the Water and Climate Resilience Metrics Final Report in Dec. 2021.

The SFWMD's commitment to resilience includes engaging stakeholders, the public, and partner agencies to support local resiliency strategies.

### Sea Level Rise and Flood Resiliency Plan

The SFWMD Sea Level Rise and Flood Resiliency Plan is the first-ever SFWMD initiative to create a comprehensive list of priority resiliency projects to help address the impacts of flooding and sea level rise throughout South Florida. The plan document also serves as a reference to the SFWMD applications submitted to the Resilient Florida and other state and federal Grant Programs.

SFWMD continues to be a leader in resiliency efforts and routinely works with stakeholders, local, state and federal governments and experts to develop strategies and project plans to ensure the SFWMD's infrastructure can respond to the changing conditions like increased sea level rise and rainfall.



G725 inflow canal at Lake Hicpochee FEB (photo by SFWMD).

## RESTORATION STRATEGIES SCIENCE PLAN STUDIES

Since Restoration Strategies Science Plan studies began to show results, the SFWMD has highlighted the studies that have made significant progress during the water year. In the 2022 SFER, Appendices 5C-1 and 5C-2 highlight the (1) Evaluation of Inundation Depth and Duration Threshold for *Typha domingensis* (Cattail) Sustainability: Test Cell Study and (2) L-8 FEB Operational Guidance, respectively.

The first study was completed during WY2021 and found that cattail plants exposed to water depths greater than 84 centimeters (cm) for 8 weeks or more showed signs of stress, which diminishes the sustainability of cattail.

The ongoing L-8 FEB Operational Guidance Study demonstrates that sediment resuspension occurring under high inflow events increases Total Phosphorus concentrations in the water column within the FEB. This material slowly settles out. Thus, the timing of outflow events after high inflow events may affect the amount of Total Phosphorus in the discharge waters. Maintaining low Total Phosphorus concentrations in the FEB discharges will benefit the performance of STA1 East and STA1 West over the long term.

## EVERGLADES RESEARCH AND ASSESSMENT

Below is a description of an Everglades study reported in the SFER for the first time. For more information see Chapter 6, Volume 1.

**Composition of Non-Native Apple Snail Mucus May Contribute to the Displacement of Florida Apple Snails.** This study documents an invasion of four freshwater wetlands by a non-native apple snail and the coincident local extinction of the native Florida apple snail in one of the wetlands. This is the first reported local extinction of the native snail correlated with invasion by the non-native snail. Experimental results point to chemical antagonism by the invading snail as a potentially important mechanism of interference between the two species and might explain why native snail distributions appear to recede with the ongoing invasion of the non-native snail in South Florida wetlands. This research has important implications for the conservation of wildlife that feed on apple snails.



Limpkin eating an apple snail (photo by SFWMD).

## FDEP BASIN MANAGEMENT ACTION PLANS (BMAPS)

During 2020, progress continued on FDEP BMAPs designed to implement nutrient reductions established by the Total Maximum Daily Loads (TMDL) for the Northern Everglades watersheds. The 2020 Statewide Annual Report on TMDL, BMAPs, Minimum Flows or Minimum Water Levels, and Recovery or Prevention Strategies details the progress made on implementation of NEEPP BMAPs through Dec. 31, 2020. See Chapter 8A, Volume I, for more information.

**Lake Okeechobee Basin.** A total of 180 BMAP projects were completed and 74 activities are listed as ongoing. Completed and ongoing projects are estimated to achieve total reductions of 208,492 pounds per year (lb/yr) or 94.6 metric tons per year (t/yr) of Total Phosphorus, or 21% of the reductions needed to meet the Total Phosphorus TMDL. The Total Phosphorus load reductions are based on model-estimated project benefits in the 9 subwatersheds. An additional 59 projects that are underway or planned are identified in the BMAP.

**St. Lucie River and Estuary Basin.** A total of 201 BMAP projects were completed and 31 activities are listed as ongoing. Completed and ongoing projects are estimated to achieve total reductions of 810,437 lb/yr or 367,608 kilogram per year (kg/yr) of Total Nitrogen or 77% of the reductions needed to meet the Total Nitrogen TMDL, and 197,798 lb/yr (89,720 kg/yr) of Total Phosphorus or 49% of the reductions needed to meet the Total Phosphorus TMDL. The Total Nitrogen and Total Phosphorus load reductions are based on model-estimated project benefits in the watershed. An additional 41 projects that are underway or planned are identified in the BMAP.

**Caloosahatchee River and Estuary Basin.** A total of 117 BMAP projects were completed and 37 activities are listed as ongoing. Completed and ongoing projects are estimated to achieve total reductions of 708,110 lb/yr (321,193 kg/yr) of Total Nitrogen, or 78% of the reductions needed to meet the Total Nitrogen TMDL for the Caloosahatchee Estuary. The Total Nitrogen load reductions are based on model-estimated project benefits in the BMAP area. An additional 77 projects that are underway or planned are identified in the BMAP. Since the tributary TMDLs were adopted only a few months prior to the 2020 BMAP update, future reports will include progress towards the tributary TMDLs.

## FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES (FDACS) AGRICULTURAL NON-POINT BEST MANAGEMENT PRACTICES (BMPS)

To date, FDACS has adopted manuals for BMPs for cow/calf, sod, equine operations, specialty fruit and nut crops, citrus, nurseries, dairy operations, vegetable and agronomic crops, and poultry operations. As of April 30, 2021, FDACS enrolled 1,568,052 agricultural acres in the Lake Okeechobee Watershed, 315,239 agricultural acres in the St. Lucie River Watershed, and 375,138 agricultural acres in the Caloosahatchee River Watershed.

FDACS is in the process of preparing a series of 14 informational videos highlighting the department's agricultural BMPs Program (covering what the program does and does not do, BMPs manuals, etc.). See Chapter 8A, Volume I, for details.



SFWMD conducting water quality sampling (photo by SFWMD).

## ADDRESSING BLUE-GREEN ALgal BLOOMS

Florida has never been more prepared to rapidly respond to blue-green algae in the water management system. While projects are being expedited to reduce nutrient pollution at its source, Governor Ron DeSantis and the FDEP prioritized resources to ensure blue-green algal blooms can be quickly addressed. The SFWMD, in partnership with the FDEP, remains ready to address harmful algal blooms while also implementing large-scale water quality improvement projects. The SFWMD also dramatically expanded water quality monitoring to better identify where there are problems and is working with state officials and communities to implement additional solutions. The public can learn more about water quality efforts statewide and how to report an algal bloom at ProtectingFloridaTogether.gov.

## BASIN-SPECIFIC ASSESSMENTS WITHIN PRIORITY AREAS

Basin-specific assessments within priority areas of all three NEEPP watersheds (Lake Okeechobee, St. Lucie River, and Caloosahatchee River) are underway, as described in Appendices 8B-2, 8C-2, and 8D-2, respectively, of Volume I. The assessments will gather information to pinpoint the nutrient sources contributing to water quality issues, recognize the existing programs that have the potential to impact those sources and their status, consider existing and planned projects and their expected impact to water quality, determine what remains to be done to improve water quality, and recommend strategic actions for future planning.

### Survival and Growth of Saplings Growing in Artificial Hummocks on a Ghost Tree Island in WCA 3A.

Peat bags simulate the environment of an elevated peat hummock, provided the environmental conditions needed for the establishment and growth of new trees on a "ghost tree island" where flooding prevents sapling recruitment. Planting saplings in artificially elevated hummocks reduces plant stress experienced during long flooding hydroperiods characteristic of southern WCA-3A and degraded tree islands. Planting saplings in peat bags may be a viable and cost-effective restoration strategy since 93% of the saplings became well established on the degraded tree island during this experiment. The elevated hummocks are expected to recruit other seedlings, trees, and peat necessary to improve the plant community on other degraded tree islands.



Saplings planted on artificial hummocks created using bags of peat (photo by SFWMD).

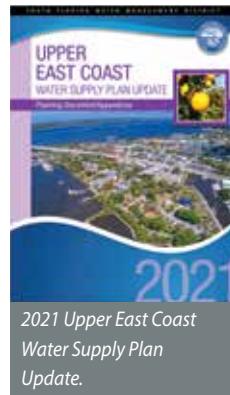
## STORAGE CAPACITY INCREASES

During WY2021, 35 projects were operational across the Northern Everglades watersheds, including 22 DWM program projects and 13 other regional projects that provide storage benefits. Collectively, these projects provided an estimated storage volume of approximately 129,000 ac-ft, with over 101,000 ac-ft from DWM projects and over 27,800 ac-ft from other projects. Also, four storage projects were in the planning, design/permitting, or construction phase, which together will provide an additional 59,000 ac-ft of storage once operational. See Chapter 8A, Volume I, for more information.

## WATER SUPPLY PLANNING UPDATES

The 2020 Central Florida Water Initiative Regional Water Supply Plan was approved by the Governing Boards of the three water management districts in November 2020.

The 2021 Upper East Coast Water Supply Plan Update was approved by the SFWMD Governing Board in November 2021.



## OTHER ACCOMPLISHMENTS

The 2021 Aquifer Storage and Recovery Science Plan was published to identify potential studies to be conducted to address scientific uncertainties of phased implementation of ASR wells.

Finalized the Loxahatchee River National Wild and Scenic River Management Plan Update.

Completed development, planning and implementation of the new Tamiami Trail Flow Formula to improve deliveries from WCA-3A into Everglades National Park under the recently implemented Combined Operational Plan (COP).

Swept over 200,000 acres of conservation and project lands to control invasive plant species, resulting in treatment of 25,000 acres of vegetation to maintain the ecological function and values of native plant communities.

SFWMD conducted prescribed burns on more than 34,000 acres of fire dependent plant communities and wetlands on managed conservation and project lands to maintain and improve the ecological values. Acres of prescribed burning completed to date represent 173% of the established burn goal (20,000 acres) for the year.

SFWMD issued a five-year Master Permit for BMP research in the EAA to evaluate impact of soil chemistry and historic land use on phosphorus concentrations and loads in farm discharges.

## KISSIMMEE RIVER AND CHAIN OF LAKES WATER RESERVATION TECHNICAL DOCUMENT AND RULES COMPLETED

Completed the rules, which were filed with the Florida Department of State on March 1, 2021, and became effective on March 21, 2021. See Chapter 3, Volume II, for more information.

As part of the water reservation process above a scientific peer review of the Upper Kissimmee – Operation Simulation (UK-OPS) Model was completed. The model simulates Upper Kissimmee Basin operations and regulatory consistency with the Kissimmee River and Chain of Lakes Water Reservation.



Everglades National Park (photo by SFWMD).

## EVERGLADES FOREVER ACT (EFA)

The EFA requires restoration efforts for the Everglades Protection Area, which includes the Everglades WCAs and Everglades National Park within the Southern Everglades. The EFA requirements include Everglades STAs, nutrient source control programs, integration with CERP components, and implementation of the Restoration Strategies for Regional Water Quality Plan. The state Phosphorus Rule sets a long-term goal of 10 micrograms per liter ( $\mu\text{g/L}$ ) phosphorus for the Everglades Protection Area.

## RESTORATION STRATEGIES

The Restoration Strategies Regional Water Quality Plan was developed to address water quality concerns associated with existing flows to the Everglades Protection Area. It contains a suite of additional water quality improvement projects to work in conjunction with the existing Everglades STAs to meet the WQBEL to achieve compliance with the State of Florida's numeric Total Phosphorus criterion for the Everglades Protection Area.

## COMPREHENSIVE EVERGLADES RESTORATION PLAN (CERP)

CERP is the single largest restoration program underway in the world. It is authorized by the Water Resources Development Act (WRDA) of 2000 and is implemented by a federal-state partnership between SFWMD and the USACE to restore, protect, and preserve the region's water resources by addressing the quantity, quality, timing, and distribution of water.

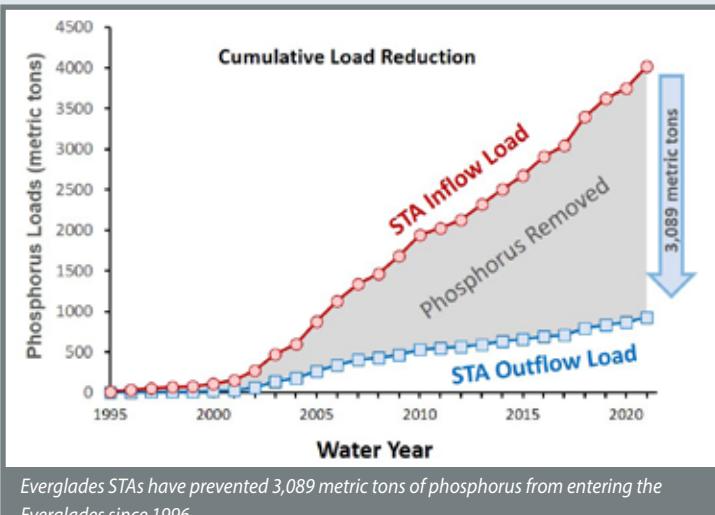
## NORTHERN EVERGLADES AND ESTUARIES PROTECTION PROGRAM (NEEPP)

NEEPP protects and restores surface water resources to support water quality improvements in the Northern Everglades region—comprised of the Lake Okeechobee, St. Lucie River, and Caloosahatchee River watersheds—and downstream receiving waters. It requires meeting of TMDLs for these water bodies. The program requires implementation of watershed construction projects, exotic species control programs, and research and water quality monitoring programs. Three agencies are responsible for fulfilling NEEPP mandates: FDEP, FDACS, and SFWMD, which are collectively referred to as the Coordinating Agencies.

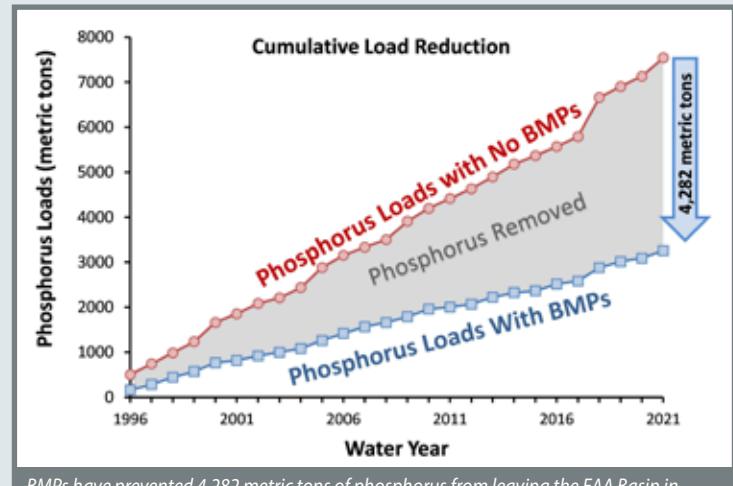
*More information on restoration projects can be found in Chapters 5A, 5B, 5C, 8A, 8B, 8C, 8D, and 9 of Volume I and in Volume III.*

## STORMWATER TREATMENT AREAS AND BEST MANAGEMENT PRACTICES HAVE PREVENTED THOUSANDS OF METRIC TONS OF TOTAL PHOSPHORUS FROM ENTERING THE EVERGLADES

Since 1994, the Everglades STAs have treated approximately 24.2 million ac-ft of water or 7.9 trillion gallons of water and retained 3,089 metric tons of Total Phosphorus with a 77% Total Phosphorus load reduction. The overall outflow flow-weighted mean (FWM) Total Phosphorus concentration from these treatment wetlands during this period has been 30 µg/L. See Chapter 5B, Volume I, for more information. The SFWMD BMP Program prevented approximately 4,282 metric tons of Total Phosphorus from entering the Everglades for the WY1996–WY2021 period. With the WY2021 results, the 26-year average annual Total Phosphorus load reduction for the program is 57%. EAA basin runoff is directed to the Everglades STAs for further nutrient reduction before discharging to the Everglades Protection Area. See Chapter 4, Volume I, for more information.



Everglades STAs have prevented 3,089 metric tons of phosphorus from entering the Everglades since 1996.



BMPs have prevented 4,282 metric tons of phosphorus from leaving the EAA Basin in stormwater runoff since 1996.

## WADING BIRDS ARE CONNECTED TO THE HEALTH OF THE EVERGLADES

Wading birds help us understand the health of the Everglades. We know that if we get the water right for wading birds, we're getting it right for the ecosystem. SFWMD ecologists track the timing, location and distribution of wading bird nesting, as well as foraging patterns, in addition to other activities. The SFWMD regularly monitors ibises, wood storks, herons, roseate spoonbills and egrets. These species serve as important ecological indicators, especially during exceptionally wet and dry years. Most species exhibited considerably increased nesting efforts and nesting success during 2021. An estimated 100,000 wading bird nests were initiated in the Everglades during 2021. Of note was the large nesting effort by the white ibis (75,000 nests), which is over three times higher than the 10-year average. This very successful nesting season in the Everglades was largely a result of much wetter than average antecedent conditions followed by a consistent winter dry-down, which together provided optimal foraging habitats for nesting birds at the right time and place. See Chapter 6, Volume 1, for additional information.



Wood stork nesting in Everglades National Park (photo by SFWMD).



CAPTURED: Python hunters hold their record breaking 18 foot 9 inch python eliminated as part of SFWMD and FWC's python elimination program (photo by SFWMD).

Governor Ron DeSantis charged the SFWMD and the Florida Fish and Wildlife Conservation Commission (FWC) with taking aggressive action to protect the Everglades and eliminate invasive pythons from across the landscape.

This partnership proved successful as the agencies work together to remove these nonnative predators. To date, over 7,200 Burmese pythons have been removed from the Everglades and the surrounding rural areas. Pythons are non-native, invasive snakes that pose direct threats to native wildlife. Pythons cause significant impacts to native prey, such as marsh rabbits, deer, wading birds and even alligators. Their aggressive predation negatively impacts the food sources of native species including panthers, raptors, alligators, and bobcats.



Foraging birds in WCA 1 (photo by SFWMD).



*Black-necked Stilt Chick in STA5 (photo by SFWMD).*

## REQUIRED REPORTING FULFILLED BY 2022 SFER

The Florida Statutes (F.S.) contain specific reporting requirements that the SFER fulfills.

### Consolidated Water Management District Annual Report

373.036(7), F.S., requires a consolidated report on the management of water resources be submitted annually. The 2022 SFER fulfills this requirement for SFWMD.

#### Volume I

- Appendix 1-2 provides the Everglades restoration report.
- Appendix 1-3 provides the Everglades Trust Fund expenditure report.
- Chapters 3A, 3B, 4, 5A, 5B, 5C, 6, and 7 and associated appendices provide an update on Everglades progress.
- Chapters 8A, 8B, 8C, and 8D provide the Northern Everglades and Estuaries Protection Program annual progress report.

**Volume II** provides an annual update on the project status during Fiscal Year 2021 and planning for Fiscal Year 2022 for nine annual reports required of all water management districts.

**Volume III** of the 2022 SFER provides an annual update on environmental restoration projects to comply with permits issued by FDEP. Currently, annual updates are provided for eight projects under construction, 16 projects operating, and two projects operating that also had a phase or component under construction during the water year.

#### Ron DeSantis, Governor

#### SFWMD Governing Board

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**Scott Wagner**, Vice Chairman  
**Ron Bergeron Sr.**  
**Ben Butler**  
**Charlie E. Martinez**  
**Cheryl Meads**  
**Charlette Roman**  
**Jay Steinle**  
**Jacqui Thurlow-Lippisch**

**Shawn Hamilton**, Secretary,  
Florida Department of  
Environmental Protection

#### SFWMD Executive Management

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**John Mitnik**, Asst. Executive Director & Chief Engineer  
**Carolyn Ansay**, General Counsel  
**Stephen Collins**, Real Estate Director  
**Sean Cooley**, Communication & Public Engagement Director  
**Jill Creech**, Regulation Director  
**Lawrence Glenn**, Water Resources Director  
**Candida Heater**, Administrative Services Director  
**Lisa Koehler**, Big Cypress Basin Administrator  
**Duane Piper**, Chief Information Officer  
**Jennifer Reynolds**, Ecosystem Restoration/  
Capital Projects Director  
**Jennifer Smith**, Chief of Staff  
**Rich Virgil**, Field Operations Director

## Get the latest information from SFWMD

Learn more about Everglades restoration projects in South Florida by signing up for the District's emails. Visit [SFWMD.gov](http://SFWMD.gov) and click on "*Subscribe for Email Updates.*"

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